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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/685,924	10/15/2003	Manabu Aizawa	09792909-5699	7047

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EXAMINER	
WHITTINGTON, KENNETH	
ART UNIT	**PAPER NUMBER**
2862	

DATE MAILED: 11/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	**Application No.** 10/685,924	**Applicant(s)** AIZAWA ET AL.	
	Examiner Kenneth J. Whittington	**Art Unit** 2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _23 October 2006_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1,3,5,6,8-13 and 15_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1,3,5,6,8-13 and 15_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _15 October 2003_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The Amendment filed October 23, 2006 has been entered and considered. In view thereof, the rejections of claims 3 and 5 under 35 USC 112 have been withdrawn.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 3, 5, 6, 8-13 and 15 are rejected under 35 U.S.C. 103 as being obvious over Rovner (US 3,825,823) in view Fragola et al. (US 2,389,146), hereinafter Fragola and Yamada et al. (US 6,407,547), hereinafter Yamada. Regarding claims 1, 8 and 15, Rovner teaches:

a magnetic detection unit having two or more magnetic detection devices with directionality, the magnetic detection devices being disposed at equal intervals based on a predetermined rule in such a way that directionalities thereof are different from each another, the detection devices on a loop core having an excitation coil there around (See Rovner FIG. 1, detection coils 21-26, core 11 and excitation coil 15);

a sampling unit for sequentially switching and sampling electromagnetic conversion outputs of magnetic detection devices of the magnetic detection means (See FIG. 1, item 12 and col. 4, lines 18-56);

a condition determining unit for determining whether or not the electromagnetic conversion output being sequentially switched and sampled by the sampling means meets a predetermined condition (See FIG. 1, items 17, 51 and 52 and col. 4, line 57 to col. 6, line 46); and

a azimuth information output unit for outputting magnetic azimuth information based on a result of the determination of the condition determining means (See FIG. 1, item 28), and

the two or more magnetic detection devices disposed in a wheel-spoke arrangement (See FIG. 1, note general wheel arrangement with center connected detection coils connected to center to create a spoke arrangement).

However, Rovner does not teach each of the detecting devices comprising a core, an exciting coil and a detection coil oriented in a radial arrangement. Fragola teaches using a segmented flux valve, each segment comprising a core, an exciting coil and a detection coil oriented in a wheel pattern such that two adjacent cores are positioned to point along their respective axes from a common point (See Fragola FIG. 3, and see page 2, col. 2, line 62 to page 3, col. 1, line 33) as well as a flux valve having detection devices having separate detection coils but using a common loop core and excitation coil wrapped there around (See FIG. 1, core 11, excitation coil 12 and detection coils 16-19). It would have been obvious at the time the invention was made to incorporate the segmented design of Fragola into the loop design of Rovner. One having ordinary skill in the art would have been motivated to do so because as noted in Fragola, using a segmented core flux valve is an equivalent alternative to the loop core flux valve and furthermore one having ordinary skill would use of either one depending on the particular requirements of the system and on the fabrication capabilities (See Fragola page 2, col. 2, line 62 to page 3, col. 1, line 33).

This combination further does not teach forming the core and coils using a thin film processing using two-layer structure. Yamada teaches a process for manufacturing a fluxgate having a core and coils on a substrate using a thin film processing and creating the coils using a two-layer structure connected together via blinds, such comprising a thin film loop-shaped core, thin film excitation coil and detection coil on a non-magnetic substrate (See Yamada FIGS. 2A, 2B, 3A, 3B and 4A-4E and col. 3, line 29 to col. 4, line 35, note thin film core item 1, thin film coils items U and L, insulating layers items LI and UI, and non non-magnetic substrate 100). It would have been obvious at the time the invention was made to incorporate the manufacturing method as taught by Yamada et al. in the apparatus of the noted combination. One having ordinary skill in the art would have been motivated to do so to accurately develop and align the respective exciting coil and detecting coils for improved magnetic field detection and provide a fluxgate requiring only a small space (See col. 1, line 66 to col. 2, line 5 and col. 4, lines 36-46).

Regarding claim 3, the noted combination teaches each magnetic azimuth device comprising a magnetic core made of soft magnetic material, an excitation coil and a detection coil (See Fragola FIG. 3, and see page 2, col. 2, line 62 to page 3, col. 1, line 33).

Regarding claim 5, the noted combination teaches one excitation coil corresponding to the two or more magnetic detection devices to form one excitation coil shared by all magnetic detection devices (See FIG. 1, core 11, excitation coil 12 and detection coils 16-19).

Regarding claim 6, the noted combination teaches the magnetic detection coils have the same one end (See Rovner FIG. 1, note that all coils are connected to the common ground).

Regarding claim 9, the noted combination teaches the magnetic core comprising a material that enables provision and elimination of inductive magnetic anisotropy to be carried out with heat treatment in a magnetic field (See Rovner FIG. 1, item 11 and col. 8, lines 47-51, note also that permalloy is a well known soft magnetic material that increases magnetic permeability upon heat treatment-see Non-patent literature internet reference explaining the known heat treatment of permalloy well known since 1923 and Ihara et al., US5,028,280).

Regarding claim 10, the noted combination teaches the sampling means switches electromagnetic conversion outputs of the magnetic detection devices, and performs synchronous detection of a switched signal with a predetermined frequency, thereby sampling a voltage change corresponding to an external magnetic strength (See Rovner FIG. 1, item 12 and col. 4, lines 18-56).

Regarding claim 11, the noted combination teaches the sampling means sequentially operating switches in response to a signal from a binary counter if the number of detection coils of the magnetic detection devices is set to be 2^n, the number of the switches being the same as that of the detection coils (See Rovner FIG. 1, item 12 and col. 4, lines 7-56, note that any number of sensing means can be used in the device of Rovner, encompassing 2^n. Further note the clock means 29 provides a pulse signal for the switches).

Regarding claim 12, the noted combination teaches the condition determining means supplies a trigger signal to the azimuth information output means as a result of determination if the electromagnetic output being sequentially sampled by the sampling means is a maximum, a minimum, or zero crossing (See Rovner FIG. 1, items 17, 51 and 52 and col. 4, line 57 to col. 6, line 46).

Regarding claim 13, the noted combination teaches the azimuth information output means outputs a signal for switching, which is sampled by the sampling means if the trigger signal is received from the condition determining means, as information indicating an azimuth of the external magnetic field (See Rovner FIG. 1, items 17, 51 and 52 and col. 4, line 57 to col. 6, line 46).

Response to Arguments

Applicant's arguments filed along with the noted Amendment have been fully considered but they are not persuasive.

Regarding the amendments in view of the outstanding rejections, the only argument asserted by Applicant is that the noted combination does not teach a wheel spoke arrangement, particularly that Fragola does not teach such because it teaches a polygon.

Initially, it is noted that FIG. 19 of the application and the associated specification merely disclose eight cores emanating from a common center. There is no "wheel" illustrated or described. Thus, to require features beyond cores extending from a common center would be new matter.

As noted in the rejection above, Rovner teaches a general wheel arrangement with the core having a generally wheel shape, the detection coil wires extending through the middle being "spokes". Furthermore, the segmented core in Fragola as shown in FIG. 3 retains a general wheel-like appearance. Furthermore, each pair of adjacent cores in the loop core are positioned to point along their respective axes from a common point (See Fragola FIG. 3, note cores 52), i.e., since adjacent cores are connected at screws 53, they extend therefrom.

In view of the forgoing, the noted combination teaches the claims as amended.

It is noted that the noted combination teaches only two cores extending from a common point. As a matter of suggestion only, amending claims 1 and 15 to recite the magnetic detection unit having three or more magnetic detection devices and "the three or more magnetic detection devices disposed in a wheel-spoke arrangement with their cores positioned to point along their respective axes from a common point" would overcome the above noted combination.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth J. Whittington whose telephone number is (571) 272-2264. The examiner can normally be reached on Monday-Friday, 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kenneth J Whittington
Examiner
Art Unit 2862

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